MMD - ED - QMC Meeting

Ambrosia Lake Site

Name	Title	Phone
Marvin Freeman	Vice President - MMD	405-848-1187
Robert S. Young	Engineer - MMD	827-1178
Ike Hand Shepard	Bureau Chief - MMAB	827-5971
Mary Ann Mackey	Surface Mining Rec Spec. NMED	827-2944
Terry Fetchu	Quivira	287-8851
Peter Luthiger	"	
Richard Ambrom	NMED	827-0213
Kathleen Garland	Director, MMD	827-5974
Bill Ferdinand	Quivira	287-8851

8/11/95 - FF

Mtg & Field visit at Quivira

9102357

N M ENVIRONMENT DEPARTMENT - GROUND WATER SECTION
MONITOR WELL CONSTRUCTION AND ABANDONMENT GUIDELINES

Purpose: These guidelines provide minimum construction and abandonment standards for drilled monitor wells which are to be sampled for general chemistry analyses. There may be additional requirements if hydrocarbons or other chemicals are involved. Also different guidelines may apply for other types of well construction such as driven wells.

General Drilling Specifications

1. The bore hole shall be drilled a minimum of 4 inches larger than the casing diameter to allow for the emplacement of sand and sealant.
2. No contaminants shall be present in the drilling mud.
3. All drill bits, drill rods, and down-hole tools shall be thoroughly cleaned prior to the start of drilling.
4. After completing the well casing installation, the well shall be developed so that formation water flows freely through the screen and is not turbid, and all sediment has been removed from the well.

Well Specifications (Refer to figure on reverse side.)

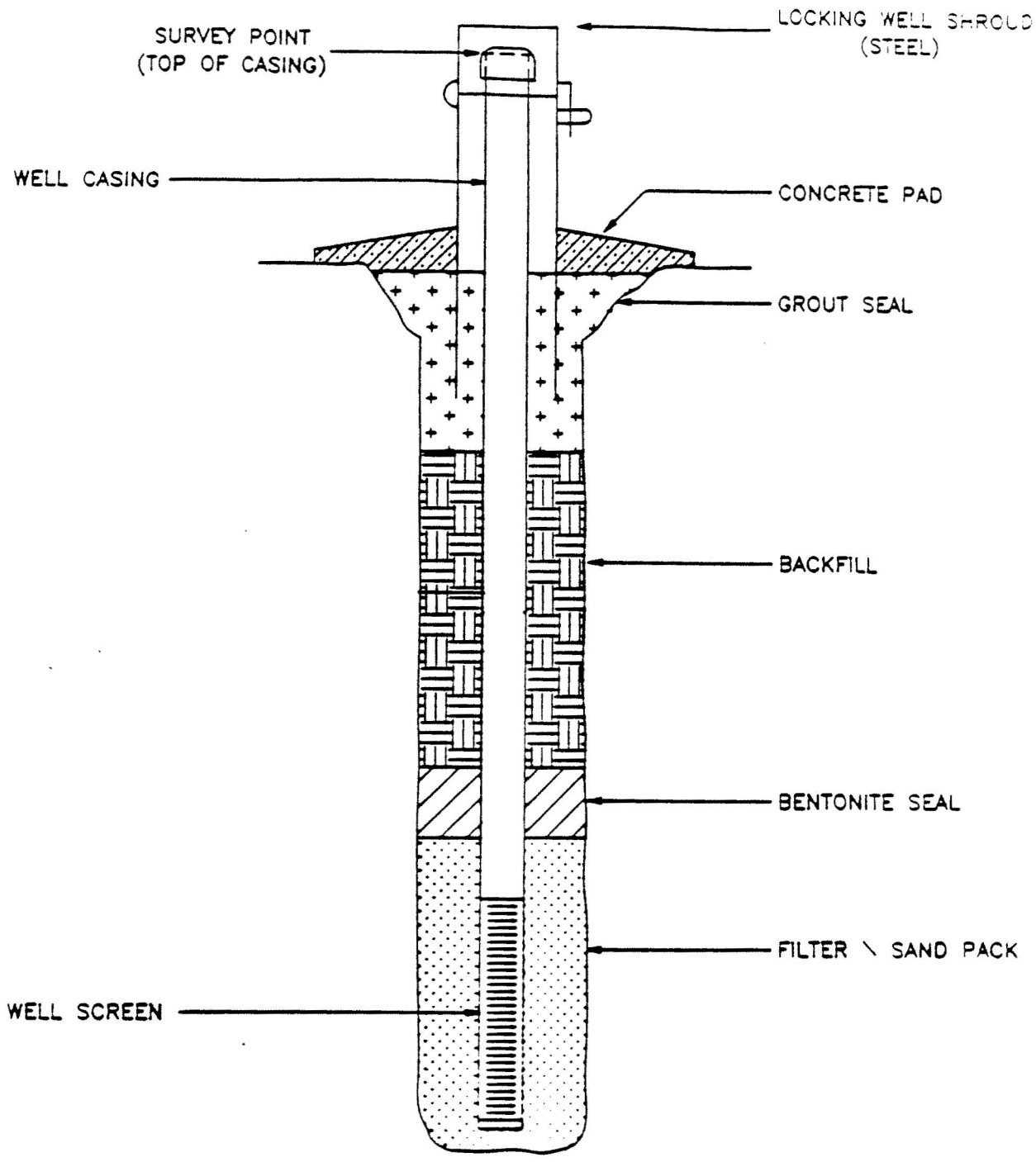
1. Use Schedule 40 or heavier PVC pipe, not less than 2 inches ID, as casing. The casing shall extend from the top of the screen to at least one foot above ground surface. The top of the casing must be protected by a cap, and the exposed casing must be protected by a locking shroud. The shroud shall be large enough in diameter to allow easy access for removal of the plastic cap on the PVC casing.
2. Use a minimum 20-foot section of machine slotted or other manufactured screen. A slot size of 0.010-inch generally is adequate for most installations. (No on-site, hack-saw slotting.)
3. The top of the screen shall be 5 feet above the water table, allowing for seasonal fluctuations.
4. The screen section should have centralizers at the top and bottom.
5. The annular space from the bottom of the screen (2 feet below the bottom of the screen if a blank section of casing is placed below the screen) to 2 feet above the screen shall be packed with sand. Clean, medium to coarse sand is recommended. The sand pack should be properly sized to prevent fines in the formation from entering the well. For deeper wells the sand shall be placed by a tremmie pipe.
6. The annular space above the gravel pack shall be grouted or sealed. Pressure grouting with bentonite or cement using a tremmie pipe is preferred. The alternative is to form a bentonite seal by placing bentonite pellets (1/4 or 1/2 inch in size) for at least 2 feet above the gravel pack and proceding in accordance with Item 7 below.
7. The annular space above the bentonite seal can be filled with drill cuttings, or clean sandy clay or tighter soil to within 10 feet of the ground surface. The remaining 10 feet must be sealed with a bentonite-cement grout seal (two to eight percent bentonite by weight).
8. A two-foot minimum radius, four inch minimum thickness concrete pad shall be poured around the shroud. The concrete shall be sloped that rainfall and runoff flows away from the shroud.

Abandonment: Monitor wells no longer in use shall be plugged in such a manner as to preclude migration of surface runoff or ground water along the length of the well. Where possible, this shall be accomplished by removing the well casing and pumping expanding cement from the bottom to the top of the well using a tremmie pipe. If the casing cannot be removed, the casing shall be ripped or perforated along its entire length if possible, and grouted. Filling with bentonite pellets from the bottom to the top is an acceptable alternative to pressure grouting.

Variances: Requests for variances from these guidelines shall be in writing to the Program Manager, NMED Ground Water Section, 1190 St. Francis Drive, P. O. Box 26110, Santa Fe, NM 87502. Each request shall explain in detail the evidence supporting the request. The GWS approval also shall be in writing.

Signed: _____ Date: 8/18/92

Ernest C. Rebuck, Program Manager, Ground Water Section



GENERALIZED MONITORING WELL SCHEMATIC

(Not To Scale)

Class V Injection Well Subclasses

Table 2

Name of Well Type and Description	Ground Water Contamination Potential	Potential Contaminants	EPA Well Code
DRAINAGE WELLS (a.k.a. DRY WELLS) Agricultural Drainage Wells — receive irrigation tailwaters, other field drainage, animal yard, feedlot, or dairy runoff, etc.	High	Pesticides, nutrients, pathogens, metals transported by sediments, salts.	5F1
Storm Water Drainage Wells — receive storm water runoff from paved areas, including parking lots, streets, residential subdivisions, building roofs, highways, etc.	Moderate	Heavy metals (Cu, Pb, Zn) organics, high levels of coliform bacteria. Contaminants from streets, roofs, landscaped areas, Herbicides, Pesticides.	5D2
Improved Sinkholes — receive storm water runoff from developments located in karst topographic areas.	High-Moderate	Variable: pesticides, nutrients, coliform bacteria.	5D3
Industrial Drainage Wells — wells located in industrial areas which primarily receive storm water runoff but are susceptible to spills, leaks, or other chemical discharge.	High-Moderate	Usually organic solvents, acids, pesticides, and various other industrial waste constituents. Similar to storm drainage wells but usually higher concentrations.	5D4
Special Drainage Wells — used for disposing water from sources other than direct precipitation. Four types were reported: landslide control drainage wells (Montana), potable water tank overflow drainage wells (Idaho), swimming pool drainage wells (Florida), and lake level control drainage wells (Florida)	Moderate-Low	Chlorinated and treated water, pH imbalance, algaecides, fungicides, muriatic acid.	5G30
GEOTHERMAL REINJECTION WELLS Electric Power Reinjection Wells — reinject geothermal fluids used to generate electric power — deep wells.	Moderate	pH imbalance, minerals and metals in solution. (As, Bo, Se), sulfates.	5A5
Direct Heat Reinjection Wells — reinject geothermal fluids used to provide heat for large buildings or developments — deep wells.	Moderate	Hot geothermal brines with TDS between 2,000 to 325,000 mg/l. Co_3, $CaSO_4$, Sr and Ba, As.	5A6
Heat Pump/Air Conditioning Return Flow Wells — reinject groundwater used to heat or cool a building in a heat pump system — shallow wells.	Low	Potable water with temperatures ranging from 90° to 110° F., may have scale or corrosion inhibitors.	5A7
Groundwater Aquaculture Return Flow Wells — reinject groundwater or geothermal fluids used to support aquaculture. Non-geothermal aquaculture disposal wells are also included in this category (e.g. Marine aquariums in Hawaii use relatively cool sea water).	Moderate	Used geothermal waters which may be highly mineralized & include traces of arsenic, boron, fluoride, dissolved & suspended solids, animal detritus, perished animals and bacteria.	5A8
DOMESTIC WASTEWATER DISPOSAL WELLS Untreated Sewage Waste Disposal Wells — receive raw sewage wastes from pumping trucks or other vehicles which collect such wastes from single or multiple sources. (No treatment)	High	Soluble organic & inorganic compounds including household chemicals. Raw sewage with 99.9% water and .03% suspended solid. May contain pathogenic bacteria & viruses, nitrates, ammonia.	5W9
Cesspools — including multiple dwelling, community, or regional cesspools, or other devices that receive wastes and which must have an open bottom and sometimes have perforated sides. Must serve greater than 20 persons per day if receiving solely sanitary wastes. (Settling of solids)	High	Soluble organic & inorganic compounds including household chemicals. Raw sewage with 99.9% water and .03% suspended solid. May contain pathogenic bacteria & viruses, nitrates, ammonia.	5W10
Septic Systems (Undifferentiated Disposal Method) — used to inject the waste or effluent from a multiple dwelling, business establishment, community, or regional business establishment septic tank. Must serve greater than 20 persons per day if receiving solely sanitary wastes. (Primary Treatment)	High-Low	Varies with type of system: fluids typically 99.9% water (by weight) and .03% suspended solids: major constituents include nitrates, chlorides, sulfates, sodium, calcium, and fecal coliform.	5W11
Septic Systems (Well Disposal Method) — examples of wells include actual wells, seepage pits, cavitettes, etc. The largest surface dimension is less than or equal to the depth dimension. Must serve greater than 20 pesons per day if receiving solely sanitary wastes. (Less treatment per square area than 5W32)	High-Low	Varies with type of system: fluids typically 99.9% water (by weight) and .03% suspended solids: major constituents include nitrates, chlorides, sulfates, sodium, calcium, and fecal coliform.	5W31
Septic System (Drainfield Disposal Method) — examples of drainfields include drain or tile lines, and trenches. Must serve more than 20 persons per day if receiving solely sanitary wastes. (More treatment per square area than 5W31)	High-Low	Varies with type of system: fluids typically 99.9% water (by weight) and .03% suspended solids: major constituents include nitrates, chlorides, sulfates, sodium, calcium, and fecal coliform.	5W32
Domestic Wastewater Treatment Plant Effluent Disposal Wells — dispose of treated sewage or domestic effluent from small package plants up to large municipal treatment plants. (Secondary or further treatment)	High-Low	Lower levels of organics and bacteria than other septic systems and cesspools.	5W12
MINERAL AND FOSSIL FUEL RECOVERY RELATED WELLS Mining, Sand, or Other Backfill Wells — used to inject a mixture of water and sand, mill tailings, and other solids into mined out portions of subsurface mines whether what is injected is a radioactive waste or not. Also includes special wells used to control mine fires and acid mine drainage wells.	Moderate	Acidic waters	5X13
Solution Mining Wells — used for in-situ solution mining in conventional mines, such as stopes leaching.	Moderate-Low	2.4% sulfuric acid, pH less than 2 for copper & ferric cyanide solution for gold or silver.	5X14
In-situ Fossil Fuel Recovery Wells — used for in-situ recovery of coal, lignite, oil shale, and tar sands.	Moderate	Steam, air, solvents, igniting agents.	5X15
Spent-Brine Return Flow Wells — used to reinject spent brine into the same formation from which it was withdrawn after extraction of halogens or their salts.	Low	Variable	5X16

Table 2 (continued)

Name of Well Type and Description	Ground Water Contamination Potential	Potential Contaminants	EPA Well Code
INDUSTRIAL/COMMERCIAL/UTILITY DISPOSAL WELLS Cooling Water Return Flow Wells — used to inject water which was used in a cooling process, both open and closed loop processes.	Low-Moderate	Anti-sealing additives, thermal pollution, potential for industrial spills reaching ground water.	5A19
Industrial Process Water and Water Disposal Wells — used to dispose of a wide variety of wastes and wastewaters from industrial, commercial, or utility processes. Industries include refineries, chemical plants, smelters, pharmaceutical plants, laundromats and dry cleaners, tanneries, carwashes, laboratories, etc. *Industry and waste stream must be specified* (e.g. Petroleum Storage Facility—storage tank condensation water; Electric Power Generation Plant—mixed waste stream of laboratory drainage, fireside water, and boiler blowdown; Car Wash—Mixed waste stream of detergent, oil and grease, and paved area washdown; Electroplating Industry—spent solvent wastes; etc.).	High	Potentially any fluid disposed by various industries, suspended solids, alkalinity, sulfate volatile organic compounds.	5W20
Automobile Service Station Disposal Well — repair bay drains connected to a disposal well. Suspected of disposal of dangerous or toxic wastes.	High	Heavy metals, solvents, cleaners, used oil and fluids, detergents, organic compounds.	5X28
RECHARGE WELLS Aquifer Recharge Wells — used to recharge depleted aquifers and may inject fluids from a variety of sources such as lakes, streams, domestic wastewater treatment plants, other aquifers, etc.	High-Low	Variable: water is generally of good quality	5R21
Saline Water Intrusion Barrier Wells — used to inject water into fresh water aquifers to prevent intrusion of salt water into fresh water aquifers.	Low	Varies: advanced treated sewage, surface urban and agricultural runoff, and imported surface waters.	5B22
Subsidence Control Wells — used to inject fluids into a non-oil or gas producing zone to reduce or eliminate subsidence associated with overdraft of fresh water and not used for the purpose of oil or natural gas production.	Low	No specific type of injected fluid noted, similar to aquifer recharge wells.	5S23
MISCELLANEOUS WELLS Radioactive Waste Disposal Wells — all radioactive waste disposal wells other than Class IV wells.	Unknown	Low-level radioactive wastes.	5N24
Experimental Technology Wells — wells used in experimental or unproven technologies such as pilot scale in-situ solution mining wells in previously unmined areas.	Low-Moderate	Varies depending on project.	5X25
Aquifer Remediation Related Wells — wells used to prevent, control, or remediate aquifer pollution, including but not limited to Sueprfund sites.	Unknown	Nutrients used in Biodegradation of organics, oil/grease, phenols, toluene.	5X26
Abandoned Drinking Water Wells — used for disposal of waste.	Moderate	Potentially any kind of fluid, particularly brackish or saline water, hazardous chemcials and sewage.	5X29
Other Wells — any other unspecified Class V wells: *Well type/purpose and injected fluids must be specified.*	Unknown	Variable	5X27

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

AUG 11 1988

URFO:GRK
Docket No. 40-8905
SUA-1473, Amendment No. 8
04008905160E

Quivira Mining Company
Manager, Nuclear Licensing & Regulations
Kerr-McGee Center
Oklahoma City, Oklahoma 73135

Gentlemen:

Our office is in receipt of your July 14 and April 28, 1987 stope leaching letters, as well as the May 10, 1988, water quality data. Accordingly, I have had my staff review your stope leaching proposal. Based upon their evaluation, it has been recommended that your license be modified to allow stope leaching, based upon demonstrated control of the injected fluids.

Therefore, pursuant to Title 10, Code of Federal Regulations, Part 40, and in accordance with the above cited letters, Source Material License SUA-1473 is hereby amended by adding License Condition No. 33 to read as follows:

33. The licensee is hereby authorized to inject chemically fortified mine waters in accordance with their July 14, 1987 submittal. The following upper control limits shall be observed: calcium = 35 mg/l, sodium = 253 mg/l, sulfate = 450 mg/l, carbonate/bicarbonate = 303 mg/l, pH = 10.0 standard units. Should any of these limits be exceeded, based upon monthly sampling, the licensee shall immediately suspend injection of chemically fortified waters, notify the USNRC, Uranium Recovery Field Office, in writing within 5 days, sample for the above parameters on a weekly frequency, and within an additional 25 days, submit a plan to remediate the situation.

The effect of this amendment is to authorize stope leaching. All other conditions of this license shall remain the same. The license is being reissued in its entirety to incorporate the revisions specified above.

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FACTS ON OLD STOPE LEACHING JURISDICTION

* Federal Primacy of UIC facilities and activities unless such authority delegated to State by EPA under an approved State program;

* The New Mexico Environment Department (NMED) granted sole regulatory authority under Federal Primacy to regulate UIC Class III (in-situ) and Class V (old stope) facilities and activities by EPA under a Memorandum of Agreement;

* The New Mexico Environment Department (NMED) was authorized as the sole State agency to regulated such UIC facilities and activities under the authority of the Water Quality Control Commission. No other entity has been such jurisdiction;

* NMED regulates Old Stope Leaching program at Quivira operations including surface facilities and disturbances associated with this program under its Discharge Plan authority;

* The old stope leaching program was permitted as an area permit (operational area). The area permit is issued to a facility site, project or similar unit. A site is defined as "the land or water area where any facility or activity is physically located or conducted, including adjacent land used in connection with the facility or activity."

* NMED required as part of its Discharge Plan and WQCC regulations that a closure plan be developed to reclaim all areas affected by the old stope leaching program including surface facilities and all areas disturbed as a result of the old stope leach program.

* The Memorandum of Agreement between EPA and the State has not been amended to incorporate MMD as having regulatory oversight at such UIC facility sites nor has the WQCC amended the constituent agency responsible for such operations or areas. EPA regulations state:

  "States with approved programs shall notify EPA whenever they propose to transfer all or part of any program from the approved state agency to any other state agency and shall identify any new division of

responsibility among the agencies involved. The new agency is not authorized to administer the program until approval by the [EPA] administrator."

* The New Mexico Mining Act concurs with the above specifically stating:

"Nothing in the New Mexico Mining Act shall supersede current or future requirements and standards of any other applicable federal or state law."

* The intent of the New Mexico Mining Act was to avoid and prevent the duplication of both administrative and substantive requirements. The author of the legislation officially stated:

"You have asked my thoughts concerning Section 7.J., especially as it applies to regulatory programs administered by the NM Environment Department (NMED). My intent concerning that section was clearly stated during the legislative session, and is still clear. "It is that areas which are covered by permitting or other regulatory activities undertaken by NMED would not also be permitted by Mining and Mineral Division (MMD)."

* NMED is on record during the mine hearings that it has no intention of relinquishing its sole management of this comprehensive program at Class III and Class V facilities and operations.

* MMD is on record during the mine hearings stating that:

"MMD believes that these [solution mining] operations are regulated by the Environment Department. To include such provisions in the Mining Act regulations would create the duplication by permitting agencies that Section 7J prohibits."

* Uranium is not subject to the Mining Act. This contention was raised by counsel for Quivira at the public hearings. The Act exempts "commodities" that are regulated by the Nuclear Regulatory Commission. Uranium is exempted under the mining definition of the Act and Rule 1.1 as the exemption includes:

"... that extraction, processing or disposal of commodities ... or other activities regulated by the federal Nuclear Regulatory Commission."

* The Nuclear Regulatory Commission regulates in-situ and old stope leaching facilities with lixiviant processing.

* The definition of mining does not include in-situ operations but rather only the disposal of refuse from such operations.